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REMARKS ON STRABISMUS.

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MR. PRESIDENT:—At our last meeting I had the honor of reading before the members of the Society a paper on Relative Accommodation.* My remarks at that time referred almost exclusively to the physiological connection between convergence and accommodation in the normal eye. It is now my desire to lay before you, as briefly as possible, some points which seem to me to be of practical importance in regard to the manner in which these two muscular forces react, or may be made to react, upon each other in strabismus and insufficiency of the recti muscles.

It may be stated as a general law that, within certain limits, by increasing or decreasing the convergence, the amount of accommodation is also increased or diminished.

It was in accordance with this law that the practice, adopted by the early practitioners, of dividing the recti interni in those cases of asthenopia where there was no strabismus, often met with success. This was at a time when the errors of refraction were not understood as they now are, and when the true nature of hypermetropia and its results had not been recognized. At a somewhat later period Donders, with his vast and exact knowledge of the whole subject, could not refrain from characterizing this practice of dividing the interni, where there was no squint, as a "melancholy page in the history of ophthalmic surgery," while on the other hand no less an authority than Von Graefe not only sanctioned this division of the muscles under these conditions, but had even performed it on two occasions.

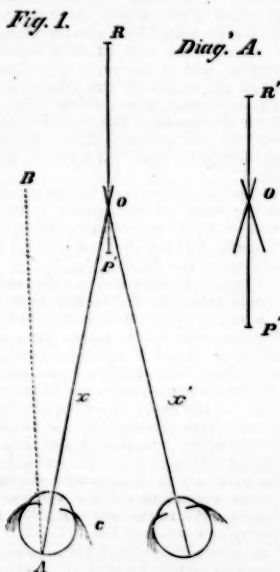
* Relative Accommodation. Trans. American Oph. Soc., July, 1868.

His justification of the operation and explanation of its *modus operandi* are so admirably given, and so essential for a correct understanding of what is to follow, that I will briefly read them to you in his own words. Von Graefe, speaking of the treatment of asthenopia in hypermetropic eyes, in which, however, there is no strabismus, says:—"There is still another cure for asthenopia which is founded on the displacement of the relative accommodation. If we weaken by a suitable tenotomy of the interni its effective ability, in such a way, however, that a correct position of the eye operated upon shall still be maintained, then every given degree of convergence will be represented by a greater tension of the interni than that existing before the operation, and a corresponding displacement of the region of the relative accommodation toward the absolute near point will be the result. The demands on the energy of the accommodative force will consequently be less." (Arch. 8, ab. ii., s. 320.)

The principle involved in this statement is so important to the subject under consideration, that I would call your attention for a moment to the diagram which I have drawn upon the board (Fig. 1, on next page), which is supposed to represent the condition taken by Von Graefe, that is to say, a pair of hypermetropic eyes suffering from asthenopia, but in which there is no strabismus. x and x' represent the optical axes, both of which intersect each other at the object viewed, o , supposed to be at 14 inches from the eye. In all hypermetropic asthenopic eyes the amount of accommodative force actually used is greater than that which is held in reserve. The amount used in this case may be represented diagrammatically as extending on the vertical line from the point o to the point K , that held in reserve as extending from o to P .

If we now divide one of the interni, say the left, c , a certain amount of divergence of the optical axis, x , from its former position would be the immediate result, exactly as it is in the common operation for strabismus. This divergence may be repre-

sented on the diagram by the dotted line extending from the point *B* to the point *A*, and it is self-evident that the tension on the internus, in order to make *x* regain its former position—i. e. intersect with its fellow at *o*—must be as much greater, after the operation than it was before, as the divergence is greater. Now what holds good for one degree of convergence holds good for all; and as we have increased the amount of tension on the interni for every given degree of convergence, we have, according to the law, also increased the amount of accommodation, or, as Von Graefe more exactly expresses it, we have displaced the region of relative accommodation toward the absolute near point. This displacement may be represented by diagram *A* in Fig. 1. The whole relative accommodation will be seen to have been displaced toward the eye; the amount of force actually expended represented in the line by the distance between *o* and *R* is seen to be much less, while that held in reserve is much greater than before the operation.



There can be no doubt, then, as to the truth of the statement that by cutting the interni we increase the amount of tension

for a given degree of convergence, and that by so doing we do indeed, temporarily at least, displace the relative accommodation. But then this can only happen, without exception, when binocular vision was present before the operation and is maintained after it. We can, therefore, by no means agree with the illustrious author when he continues by saying:—

"When, on the contrary, in consequence of hypermetropia, convergent squint has resulted and characterizes the patient, not only at work, but at other times, I am then an advocate for tenotomy, which then in all respects appears rational. The better position of the eyes, which is obtained by the operation, will, *since a greater tension of the interni is represented, exercise the same effect on the range of relative accommodation as did the original condition of the convergence, which was not only disfiguring, but which threatened the functions of the organ for continuous work.*" (Arch. 8, ab. ii., s. 321, note.)*

Now the conditions in the two cases taken by Von Graefe, namely, squinting and non-squinting eyes, are not the same, and we have no right to assume that if the same principle be applied to both it will in both be followed by the same results. The difference in the conditions taken will, perhaps, be made clearer by reference to Fig. 2 (on next page), in which diagram *a* represents a pair of non-squinting eyes, and diagram *b* a case of well-marked strabismus in the left eye. The other conditions we will suppose to be the same as those previously taken. It will be remembered that in the first diagram, representing non-squinting eyes, binocular vision already existed before the operation, but that immediately after it there was a certain amount of divergence of the optical axes of the eye operated upon relative to the object viewed, which necessitated, in order that binocular vision might be reinstated, a certain amount of tension on the interni over and above what they used before the operation. But in the second diagram (Fig. 2, *b*), representing squinting eyes, if we cut the left internus so that the optic axis of this eye intersects with that of the right at *o*, and we thus obtain binocular vision, we have obtained it, not as in the former case, from a state of divergence relative to the object viewed, but from a state of convergence; so it will be seen that the conditions are at the outset very different. But in order to understand the question fully it will be

* The italics are my own.

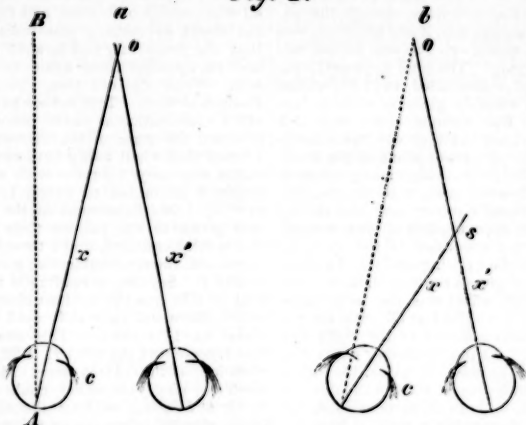
necessary to recur briefly to the principle or law upon which the assertion is founded—"That after a tenotomy a greater tension of the interni is represented, with the same effect on the relative accommodation."

This depends upon a law propounded by Von Graefe some years ago, that the effect of a tenotomy is in exact relation to the amount of displacement of the insertion of the muscle. That is to say, a convergent strabismus of three lines will be removed by setting back the insertion of the muscle three lines, &c. &c. This law is founded on mechanical principles, and is perhaps as correct as the application of any mechanical formula to the human organism can be, where the conditions in no two cases are

ever alike, and where they are constantly varying in the same individual case.

In order to explain this theory it was assumed that the amount of labor imposed upon the interni increased *pari passu* with the displacement backward of the insertion of the muscle, so that, although the convergence is lessened by the operation, the tension on the interni demanded to maintain this convergence is as great or even greater than before the operation. Admitting even that this is *per se* true, we must not forget that in estimating the power of a muscle which has a direct antagonist we must also take into consideration the force of this antagonist, and bear in mind that if the conditions under which one performs its functions

fig. 2.



are altered, those of the other are changed also. It must be remembered, too, that in squinting eyes, just as in others, there is a certain amount of tension on the internus of the eye which turns in, which is counterbalanced by a certain amount of tension of the externus. Now the effective power of the externi increases with the amount of the convergence, and it must follow that the externus of a squinting eye, other things being equal, is in a better position to lay out whatever power it may possess, than in the case where there is a normal intersection of the optic axes. So it may happen that although the tension demanded of the internus after it has been set back would naturally be the same or even greater than before the operation, yet the ability to op-

pose this tension on the part of the externi is not as great as it was before, from the comparatively disadvantageous position under which their effective force is applied. That is to say (referring to the diagram Fig. 2, *b*), it requires a greater effort for the externi to counterbalance a given amount of tension under a correct position of the axes, x intersecting with its fellow at o , than it previously did under an abnormal degree of convergence, when x intersected with its fellow at s .

Now, if from any cause the externi are idiopathically weak, then their inability to resist the tension of the interni when accommodation is going on may be so great that a proper intersection of the visual lines can only be maintained after the ope-

ration, in case the opposing tension of the interni is reduced or even entirely relaxed. If this is true, then we ought to expect, according to the law, that if the tension on the interni is reduced the relative accommodation will not be, as Graefe asserts, displaced towards the near point, but be removed from it. And as a proof that precisely this may take place, and, as I believe, not unfrequently does where binocular vision is obtained, I would beg leave to refer to the following case, recently under the care of Dr. Agnew and myself.

About the first of last May, a young lady, 19 years of age, visited us on account of strabismus, with which she had been affected from early childhood. The squint, amounting to about $3\frac{1}{2}$ lines, was perfectly concomitant in its character, as either eye was used indiscriminately, though the patient could always tell, if her attention was called to it, which eye she was for the moment employing. The total hypermetropia under atropine amounted to 1-36, vision being, with suitable glasses, a little less than one. But though there was this amount of vision in either eye, no binocular vision, in any proper sense of the term, could be called forth, though many attempts to produce it were made with prisms, colored glass, Javal's mirror and the stereoscope. The accommodation was normal, as was also the excursion of the eyes, independent of the existing squint. As there was not the slightest contra-indication, and as the cosmetic effect was the only consideration which weighed at all with the patient, the rectus internus of the right eye was divided. As the necessary effect was not obtained by this operation, the other eye was operated upon six weeks later. I will add that, on both these occasions, the tendons were thoroughly separated from the sclera. About the first of October the patient again returned. The effect which had been gained by the last operation had entirely passed away, there remaining about a line of convergence for distant objects and something more for the near. Another attempt was made to see whether binocular vision could not be called forth, but without success. The patient seemed to have, to a marked degree, what is called in text-books the "horror of binocular vision." As diplopia would not in all probability be caused, even if a slight divergence should be produced, it was determined to run the risk of a third operation, which was consequently performed.

The effect of this operation, after the wound had healed, was not as great as had

been feared, only a very trifling degree of divergence being produced, which soon passed away for distant objects, while there still remained a perceptible convergence for the near. I found, however, that there was now an attempt on the patient's part at binocular vision; that once or twice while looking at distant objects she had seen them double. I then gave her Javal's mirror, with which she practised faithfully for two months, at the end of which time she was able to see, as a constant thing, the three wafers in a vertical line, and was perfectly aware when she was using binocular and when monocular vision. She then informed me that latterly, since she had been conscious of using both eyes at a time, she did not see as distinctly as she formerly did; that she could not read at all when using both eyes, and that even in the street everything was indistinct, and that she frequently had to shut her eyes, and on opening them again to use only one. When she did this, vision became distinct at once. This led me to make another examination as to the amount of vision and the state of the accommodation. I found that when using both eyes at once vision was only 1-5; but with either eye singly it amounted to nearly 1. If, however, + 1-36 (the amount of the total II) was given to the patient, then binocular vision fully equalled, and I thought a little surpassed, the monocular, rising from 1-5 to nearly 1. So, too, in reading it was found that + 1-10 was the weakest glass through which there was easy and rapid binocular vision at 14 inches. (This convex 1-10 just represented the total II, 1-36, and the distance of the object seen, 14 inches.) Each eye singly, however, could read correctly at 5 inches without the aid of any glass, though only when its fellow deviated inward, the amount of this deviation decreasing with the strength of glass used, till it entirely ceased under + 1-10.

It will be seen from the above that under binocular vision, and what may be certainly termed "a better condition of the optical axes," not only was the relative accommodation not displaced toward the absolute near point, nor did it remain as it was before the operation, but was removed from it, and that too, to such a degree as to be annihilated, no accommodation at all remaining for any given degree of convergence from the negative far point (Ht. 1-36) to the nearest point of binocular vision at which the eyes were still accommodated for convergent rays.

But it may be said that the operations

themselves had in some way so destroyed the relationship between the accommodation and the convergence that the former could not be brought into play. Admitting that this is just what did take place, it does not follow that this result is due simply to operative interference, for precisely the same thing may take place even when no operation has been performed; for Schweigger, in his remarkable monograph on strabismus, gives a minute report of a case of squint of four lines, in which binocular vision was obtained by systematic exercise with prisms. In this case, as in the one just reported, the total hypermetropia at once became manifest as soon as binocular vision was obtained, and the field of accommodation was so far removed that even with a convergence to eight inches the eyes still remained accommodated for convergent rays. (Zehender, Jan.-Feb., 1867, p. 8.)

In summing up the remarkable points of this case Schweigger mentions, as two of its individual peculiarities, that under the influence of binocular single vision the previously existing latent hypermetropia became manifest, and that the relative accommodation was displaced. I cannot think that these are by any means individual peculiarities of this case, as I have myself not infrequently seen the latent hypermetropia become manifest after the operation, but have also occasionally seen the displacement of the relative accommodation, and believe that we should see it oftener if we examined carefully for it immediately after the operation; but the fact is, it is a much rarer thing to obtain real binocular single vision in a case of marked strabismus than we should be led to suppose from the books. I cannot think that results as remarkable as those mentioned in Schweigger's case and the one just described can be the result of chance, but believe that they are due to the common law which governs the connection between convergence and accommodation.

It seems to me that these two cases offer a beautiful example of the law sought to be established in my former paper, that for every increased tension of the ciliary muscle there is a corresponding and contemporaneous tension imparted to the interni. For, provided that accommodative efforts ceased, and the ciliary muscle consequently entirely relaxed, the externi, stimulated by the instinctive desire for binocular vision, had force enough to obtain the proper position of the optical axes, but not enough to maintain it, under the action of the ciliary

muscle; for the slightest attempt to accommodate the eye, even for parallel rays (Ht. being only 1-36), at once destroyed binocular vision, producing convergent strabismus. This certainly could not have been the case had the tension of the ciliary muscle been independent of—that is to say, capable of being disassociated from—the interni. And I believe in all cases where binocular vision has been obtained from a condition of marked strabismus, that the reason why it is permanently maintained is not because the tension of the ciliary muscle is disassociated from that of the interni, but because the tension, imparted to them under accommodative efforts which would turn the eye in, is counterbalanced by the externi, their natural antagonists, which keep the eyes straight. Now the desire for binocular vision and the power of the externi to fulfil this desire, vary exceedingly in different individuals, which accounts for the ease or difficulty with which, other things being equal, they obtain and maintain binocular vision, and neutralize any effect which the operation may have had on the relative accommodation.

There are very many points in this connection which I would gladly dwell upon, did not the limits of these remarks and a proper regard for your patience forbid.

The particular point of practical importance to which I wished to call your attention, and to arrive at which I have taken what may appear to you a needlessly long route, is this. *That where we have obtained binocular vision from a state of squint, we cannot tell what glasses may be necessary for its easy maintenance, even when we know the exact state of the refraction and the amount of monocular accommodation before the operation.* Take the case in question. Here there was only a total hypermetropia of 1-36, with a monocular accommodation of 1-4, and it might surely be supposed that binocular vision might, with so slight an error in refraction and such a range of accommodation, be maintained without any glass at all, or at the most with a correction of the total hypermetropia. But it not only required that this should be neutralized, but a very strong glass in addition, a convex 1-10 being the weakest glass which made binocular reading possible at 14 inches, which is over three times the amount of the total hypermetropia. So, too, in Schweigger's case, where the glass required for 8 inches was more than twice the total H.

May not the above fact explain the reason why convergent squint is so apt to recur

after an operation, even in emmetropic eyes, and why also we find it so difficult to obtain binocular vision in such eyes, especially for near work? And ought not such cases to point out the necessity for ascertaining at once what effect the operation has had on the relative accommodation? And if the effect has been to diminish and displace it outward, the deficiency should at once be supplied by the proper convex glasses, which should be gradually reduced in strength as the patient learns to associate a larger amount of accommodation with a smaller degree of convergence than he has been in the habit of doing; that is to say, till he learns, for the sake of binocular vision, to oppose the tension on the interni by a counterbalancing effort on the part of the externi.

The best result which can be obtained after a tenotomy is, of course, binocular single vision, and this result should always at least be aimed at, even though there be a large amount of amblyopia in the squinting eye; for, by a correct intersection of the visual lines, the combined field of vision of the two eyes is increased in size, for the images formed upon the retina of the amblyopic eye, though not intense enough to produce real binocular single vision, are yet quite enough so to give the patient perception of objects situated laterally, and thus free him, to a considerable extent, from the necessity of that continual turning of the head common to those who have only monocular vision. It is indeed asserted that even in its abnormal position the squinting eye often renders important aid, not only in lateral qualitative perceptions, but even in increasing the intensity of the impressions of the fixing eye. (Graefe.)

There is a great discrepancy among authorities as to the frequency in which binocular vision is obtained after tenotomy, Graefe and others putting the percentage as high as fifty in the hundred in its favor, while Stellwag boldly asserts that binocular single vision is scarcely ever, if ever at all, obtained.

It is manifest that both these statements are extreme, and that if Graefe's statistics are, as Stellwag claims, made up on entirely untrustworthy data, his own are deduced from results given by tests which are entirely too severe. I allude to the so-called falling test of Hering. It is certainly anything but fair to expect that a person who has been accustomed, perhaps all his life, to judge of distances with one eye with the assistance of surrounding objects, should, when these are excluded, be

able, even when using two eyes, to obtain at once, after an operation, as keen a perception of perspective as those who have always possessed binocular vision.

Without at present entering further into this subject, I feel convinced that we often obtain a fair, sometimes even a very large amount of binocular single vision—quite as much and sometimes more than is to be found among those whose optical axes have always intersected in a normal manner, but yet where, for some reason, one eye was amblyopic, as among those, for example, who have a large discrepancy in the refraction of the two eyes. For in these cases not only does the most ametropic eye always extend the field of vision, but often aids materially, even when the discrepancy is of a considerable degree, in the patient's estimation of perspective. This being the case, we should always endeavor by every means in our power, therapeutical as well as surgical, to obtain for the squinting eye as large a share in the common act of vision as possible, and should never be satisfied, as many are, with simply obtaining a good cosmetic result.

We can all of us call to mind numerous cases in our own and in our colleagues' practices where the intersection of the visual lines appeared perfect and where there was acute vision in both eyes, but yet where there was no single binocular vision; and I fear that most of us have been in the habit, after a few or perhaps without any trials with prisms, &c., of sending such patients away, quite as much elated by our own prowess in doing a tenotomy as the patient is by an improved personal appearance, and each as indifferent as the other whether vision is performed with two eyes or one.

The remarkable manner in which some patients will regain and maintain binocular vision, even after this has been lost for years, is too well proved by authenticated cases to need much comment. To show, however, that it may be often brought about by simple therapeutical means, and to illustrate some further points, I beg leave to cite the following case.

Miss L., some five years ago, had been operated upon for what she characterized as a "fearful squint." There had been two operations on the right and one on the left eye. The deformity seems to have been entirely removed, the optic axes apparently intersecting at the object viewed. The patient simply complains now of asthenopia. Vision is 1 in both eyes, though there is no binocular single vision. After a good

many trials with prisms, Javal's mirror and the stereoscope, the patient was finally brought to have double vision, the images being invariably homonymous, and separated about 10° (as measured by prisms) in twelve inches. Paralysis of the accommodation showed hypermetropia = 1-9, though the patient had previously been wearing +1-36. This would account for the asthenopia. After the atropine had passed off I ordered +1-18 for the distance and +1-12 for the near, and she was to wear the glasses as constantly as possible. Shortly after putting on the glasses the patient came back to me complaining that the pain was greater with the convex 1-18 and 1-12 than it had been with the 1-36. She wished to give up the glasses as they were "too strong for her;" but I assured her that the pain which she experienced was not because her glasses were too strong, but because they were too weak. I then told her to wear convex 1-12 continuously. After a little while she again returned, saying that the pain had been intense and constant, and that she could not wear such strong glasses. Thinking that the patient might have that intolerance of strong glasses which some hypermetropes of a high degree often show, I determined to reduce their strength. I found now, however, on examination, that the patient had easy and perfect binocular vision, and that a prism base upward gave vertical images throughout the range of accommodation, whereas in my former examination the images were homonymous, 10° in 12 inches. At the distance, however, the images were at times slightly homonymous, and the actual adductive power still preponderated greatly over the abductive, all through the range of accommodation. Thinking that the attempt to maintain binocular vision, and the consequent strain on the externi, was what had occasioned the pain, by giving rise to muscular asthenopia of these muscles, I encouraged the patient to continue with the glasses. Three months later the pain had almost ceased, while the condition of the muscles was as follows:—At 20 feet, with no positive glass, but with the colored slide there was an insufficiency of the *externi* equal to a prism of 12° . If +1-18 was added the insufficiency sank to 3° ; if +1-12, then the images are exactly vertical and remain so throughout the range of A. The adduction at 20 feet (with the convex glasses) is 5° , while the abduction amounts to 7° . At 12 inches the adduction is only equal to 8° , while the abduction amounts to 15° —the preponderance of

power now lying two to one with the *externi*, which is exactly the reverse of what it should be in the normal eye. Thus in less than six months, by simply using suitable glasses, binocular single vision was obtained throughout the range of accommodation, and the patient, from having an insufficiency of abductive force of 10° for 12 inches, obtained a positive abductive power of 15° for the same distance—a clear gain in the power of the *externi* of 25° , as measured by prisms. This gain is no doubt due to the fact that as the ciliary muscle relaxed under the glasses, the tension on the *interni* which had always been associated with it was also gradually relaxed, thus *pari passu* increasing the power of the *externi*, even after binocular single vision had been regained.

So great a gain as this in the power of the *externi* would lead us to fear that the excess of power, at first apparent in the *interni*, was not due to their intrinsic strength, but rather to the reflected or associated force from the ciliary muscle under the excessive tension imposed upon it in order to overcome the error in refraction.

We cannot but fear that, where the abductive force for the greater part of the range of accommodation is nearly twice as great as the adductive, the original and intrinsic power of the muscles had been weakened by the operations; so much so, indeed, that we may be justified in fearing that what was originally marked convergent strabismus may, after the operations and with glasses sufficiently strong to relieve the asthenopia, become insufficiency of the *interni*, or even pass into actual divergent squint.

And this leads me to a practical point upon which I wish to insist with some emphasis, and that is that we are prone, in that condition in which strabismus is most common, hypermetropia, to operate too often and at too short intervals.

As a general thing, the most careful of us are satisfied with determining the amount of deviation, the state of refraction, amount of vision and accommodation; that is, we make a careful examination of the eye before beginning with the operations, but this once made we proceed in our attempts to remove by surgical means the deformity; that is, we deliberately attack the effect without paying much attention to the cause of the squint. The effect removed, we then attack the cause by taking into consideration the error in refraction, and we prescribe glasses after one, two or three operations, as the case may be, not with the

design that they may be of any independent value in themselves in removing or lessening the squint, for this has been done by the operations, but simply to prevent a relapse from that condition which has been obtained perhaps from repeated tenotomies.

Most practitioners avoid putting on glasses till the wound of the divided tendon is entirely healed, and then, surprised at the little effect gained, resort to another operation within a period of three or four weeks, or perhaps even follow it with a third. I have myself been in the habit of prescribing glasses almost immediately after the operation; but I have not been aware till lately how important it was not to found the indication for them upon even an exact knowledge of the state of refraction gained before the operation, even by the aid of atropine, but upon data furnished after the operation from a careful study of the state of the relative accommodation both for the far and near.

I have seen just such results as those mentioned in the preceding case follow, even where no binocular vision existed, and I dare say there are many more which will ultimately go the same way, the sight of which I shall be spared. Patients who have undergone the various vicissitudes from convergent to divergent squint, have usually a disinclination to revisit the author of their woes, but there is none of us who does not from time to time get painful examples of each other's failings. The popular fear so often expressed that the eye "may go the other way," though gradually becoming less on account of improved methods of operating, is by no means extinct, either in theory or point of fact. And although we shall probably never be able to measure exactly the effect of a tenotomy, we can at least do everything in our power to come as near to it as possible, and thus avoid disagreeable consequences, and one of the best ways of doing this, I believe, to treat more and operate less. To this effect I would suggest the propriety, in all cases of convergent squint in hypermetropic eyes, of reducing as far as possible the error of refraction before any operative interference is had at all, for the purpose of removing from the interni, as much as possible, the abnormal tension associated with excessive action of the ciliary muscle. By this means I am certain, from my past experience, that we should in the majority of cases reduce the angle of deviation, sometimes even to a great degree, and thus avoid to a considerable extent those numerous "set-tings-back" of the muscles so detrimental to the

easy and lasting performance of their natural functions.

With this brief outline of the manner in which relative accommodation may behave in actual strabismus, I would call your attention for a few moments to a kindred condition—insufficiency of the externi, which is often provocative of homonymous diplopia and intermittent strabismus. Strictly speaking, weakness of the externi recti where there is no anomaly of refraction is exceedingly rare, while in myopia of the highest degree it is not of infrequent occurrence, and in hypermetropia want of proper abductive power is rather the rule than the exception.

We have seen, in the earlier part of these remarks, that if the tension upon the interni was increased, the relative accommodation was displaced toward the near point, and it would naturally be supposed that if the tension on the interni was lessened the relative A, instead of being displaced inward, would be removed outward. Now if the externi are weak, it of course follows that it will require less tension on the interni to make the visual lines intersect at a given convergence than if they offered their usual resistance; and if this tension is lessened, it ought to follow that the relative accommodation will be removed further from the near point than under the normal equilibrium of the muscles. But in all cases of marked insufficiency of the externi which I have examined in emmetropic eyes, the field of accommodation was displaced toward the near point, not, as we should expect, removed from it.

These patients have to hold their book near to the eye, some exceedingly so, and the explanation might be sought in the fact that the externi are not strong enough to resist the interni, and thus obtain a proper crossing of the visual lines at even a moderate distance from the eye. But it must be remembered that these very patients have the power of carrying out the visual lines to parallel axes, as is shown from the fact that their diplopia is rarely if ever constant, while in some cases it is never, as it were, spontaneous, but can only be called forth by the colored glass. Why is it, then, that these patients, if they can overcome the interni to such a degree as to obtain parallel axes, cannot carry out the visual lines sufficiently to allow them to read at a distance greater than 14, 12, or even 8 inches, as the case may be?

The explanation of this is, I think, to be found in the action of the accommodation, or rather in the associated action of the

ciliary and the interni recti muscles. Under the tension of the ciliary muscle necessary to make reading possible, there is also a corresponding associated tension on the interni, which has the tendency to turn the eye in, and which is counterbalanced in the normal eye by the opposing tension of the externi. If now for any given degree of convergence at which the object is held, the strain put upon the externi in order to resist the interni, while accommodation is going on, is greater than they in their weakened condition can bear, they must of a necessity yield to the superior force; and the result is that the eyes are thus converged to a point nearer than the object, which has to be gradually brought nearer and nearer till a point is reached where the tension on the interni is so great that the externi, though reduced in power, can resist it. But as soon as the accommodation necessary for distinct vision for a near point is relaxed, and with it the associated tension on the interni, the externi are then able, freed from any opposing force, to carry the visual lines out till they become parallel.

Now although a high degree of convergence is necessary in these cases for close work, of course the tension on the interni is not so great for the same degree of convergence where the externi are weak, as where they are of normal strength. Thus we see that the relative accommodation may be displaced inward, even when the tension on the interni for every given degree of convergence is reduced.

In emmetropia it is evident that this displacement inward of the field of accommodation can only take place, to any marked extent, where the insufficiency of the externi is of a very high degree, because as we approach the near point the effective ability of the externi gradually increases, and it requires but little force on their part to maintain the equilibrium of muscular power at the point ordinarily selected for near work. Still that this displacement may take place will be shown by the following case, which I the more willingly cite as I can find but one other like it on record.*

C. B., *et. 17*, has complained of his eyes "being weak" for over a year, during which time he has been troubled with the common symptoms of asthenopia. He has been wearing a weak convex glass (+ 1.36), which has given him but slight relief. Latterly all his symptoms have increased, com-

bined with occasional double vision. While reading, the patient habitually holds his book at about 7 inches, but can, with an effort, still read at 12, but not further. The examination gave the following results. Refraction emmetropic (under atropine); V. = 1; A., normal. If one eye is covered with the colored glass then homonymous images follow, separated, as measured by prisms, 30° in 20 feet. These images combine at 8 inches, and at 6 vertical diplopia is obtained by a prism, base up. If the candle is held at 8 inches and then moved to either side of the median line 4 inches, homonymous images follow, the images being always on the same plane. The diagnosis was consequently a large amount of insufficiency of the externi; there was, however, no actual strabismus.

The right internus was now divided, and six days after the operation the insufficiency had sunk from 30° to 10° for 20 feet; homonymous images were present only outside of 10 feet, and at 12 inches the candle could be carried all across the visual field without producing homonymous diplopia. The region of distinct vision for near work has been very largely increased, for whereas the patient could not read before the operation at a greater distance than 12 inches, he now reads as far as the type can be seen by the average normal eye, 8 to 4 feet. Ten days later the insufficiency had risen again from 10° to 18° for 20 feet, and it was not till the candle had approached the eye to 18 inches that the homonymous images combined. The abduction at 12" now amounted to 2°, the adduction to 18°. The left internus was now divided, and the results of the examination made three weeks after the last operation were as follows. If the colored glass was used alone over one eye there was no homonymous diplopia, even for 20 feet, nor did this occur anywhere from the distance up to the near point, even when the candle was moved laterally across the field of vision; but if the prism, base up, was added, a small degree of insufficiency (one or two degrees) of the externi was still apparent. The patient is entirely relieved of his asthenopia and diplopia, and can use his eyes to the full amount without experiencing any inconvenience.

In the above case there are two principal points to which I would particularly call your attention. (1.) That although there was no actual strabismus, both interni had to be divided to restore the muscular equilibrium. (2.) That although the patient could, with an effort, carry out his optic

* *Klinische Beobachtungen Pagenstecher. Drittes Heft, 1866, p. 96.*

axes to the parallel, the relative accommodation was so displaced inward, when the eye was adjusted for near objects, that distinct vision was not possible outside of 12 inches, while near work was usually performed at 7.

To show that this displacement of the relative accommodation may take place when the insufficiency of the externi is the result of operative interference, I would call your attention to the very interesting case presented at one of the late meetings by a member of the N. Y. Ophthalmological Society. The patient was a young lad of about 12 years of age. In this case there was a total hypermetropia of 1-8, with vision = 1. There was an insufficiency of the interni amounting to 8° for the far, and 14° for the near. In order to relieve this, both externi were divided at the same sitting. The result of this double tenotomy was homonymous diplopia of so great a degree that single vision was only obtained when the object was brought within 6 inches of the eye. This diplopia gradually became less, till at the end of three weeks it only occasionally manifested itself. The patient's total hypermetropia was neutralized, + 1-8 being given. With these glasses vision was 1, and there was no diplopia. The error in refraction having been completely neutralized, the eye might be considered as an emmetropic eye, in so far that, when in a state of rest, it was accommodated for parallel rays, and consequently had to call forth only that amount of accommodation for a given convergence that a normal eye would; and yet the relative accommodation was very different from that of an emmetropic eye, it being displaced so far inward that the patient could not read outside of 14 inches, while a boy of his age, with vision 1, ought to be able to read common print at 3 or 4 feet.

It would be advanced at once in such a case that the externi had been so weakened by the operations that they had not strength enough to carry out the visual lines, so as to make them intersect at a greater distance than 14 inches. But why have not they the requisite force for this if they have sufficient to produce parallel axes, which require a great deal more strength? The only answer to this, that I can see, is the one already given, with a repetition of which I will not weary you.

A further examination showed that the actual abductive power remaining after the operations was, expressed in prisms, only 3°, which is a trifle less than one-quarter

what it should be, while the adduction was only 6°, which is also about one-quarter of what it is in the normal eye. The relative far point for reading is at 14 inches, while the near point is at 6, making the relative accommodation about 1-12, which is certainly one-half, if not one-third what it should be. Thus we find, in a high degree of hypermetropia, a condition brought about which not unfrequently occurs in exaggerated forms of myopia, where an insufficiency of the externi coexists with that of the interni, together with a reduction of accommodative force.

This reduction in the power of the muscles presiding over the accommodation would lead, we might fear, to some form of asthenopia, either from the ciliary, interni or externi muscles. The fact, however, that notwithstanding the great reduction in force, the proportion between the abduction and adduction remains nearly normal, is very favorable, for if the actual power of both interni and externi increases, the muscular equilibrium between them will probably be maintained.

Although we very rarely find actual insufficiency or even a reduction of abductive force in emmetropic eyes, in hypermetropia, on the contrary, it is so common as to be in fact the rule. This led Giraud Teulon to express the belief that there is the same inherent tendency in hypermetropic eyes toward weak externi that there is in myopic eyes toward weak interni. Now wherever there is a tendency so strong as to amount almost to a law there must be some cause for it, and the chief causes why the abductive force is abnormally low in hypermetropic eyes are, I believe, two. (1.) That the associated tension of the ciliary muscle in overcoming the error in refraction gives an increased amount of power to the interni. (2.) That the effective force of the externi is *per se* also lessened by the anatomical construction of the hypermetropic eye. In the normal eye, as you are well aware, the externus is inserted further back than the internus, which, in itself, other things being equal, gives an advantage to the interni, and this advantage is disproportionately increased in the hypermetropia, because from the shortened antero-posterior axis the centre of rotation, though relatively more posterior, is more on a plane with the insertion of the muscle, which for this reason has less leverage than in the normal eye.

This want of abductive force may be either actual or apparent. If actual, it de-

depends on some want of power in the muscles themselves, and may be occasioned in three principal ways.

(1.) Through an abnormal preponderance both of volume and force of the recti interni over the externi, which may in themselves be below the normal standard. This condition is generally inherited from parents who have themselves squinted, and in whom, in consequence, the interni have become from constant exercise unduly developed, while the externi, from want of use and from being constantly on the stretch, have lost both volume and vigor.

(2.) From faulty insertion of the muscles, on account of which the interni have the preponderance of power.

(3.) From a state of debility, either temporary or permanent, which has been developed by a constant straining on the part of the externi in order to maintain binocular vision, while the eye is calling forth its accommodation in order to neutralize the error in refraction.

This latter depends on the intimate relation which exists between convergence and accommodation, and which has been more fully dwelt upon in the earlier part of these remarks.

It is evident that in these cases where there is inherent weakness, be it natural or acquired, in the externi, the correction of the error of refraction, though it may give relief, will not remove the whole cause of the trouble; and this is one of the reasons why some hypermetropes, even when provided with suitable convex glasses, still continue to suffer from asthenopia.

Instead, however, of being actual, this insufficiency of abductive force may be only apparent. When it is so, it is due entirely to the efforts of the accommodation to overcome the error in refraction, and disappears as soon as this is corrected by glasses. This will be better explained by an example.

A patient has Hm. = 1-16, Ht., as estimated by the ophthalmoscope, between 1-10 and 1-12. If the condition of the muscles is examined at twelve inches from the eye without the hypermetropia being neutralized by glasses, then the amount of adduction is found to equal a prism of 20° , while the abduction amounts to only 4° . But if the error of refraction is corrected, then the amount of adduction rises to 18° , while the abduction in this particular case undergoes but little change. It is, as a rule, however, slightly decreased.

This shows that the disproportionately low force of abduction is due in this and

similar cases not to any idiopathic weakness of the muscles themselves, but to the fact that the nervous impulse, by which the ciliary muscle is able to overcome the error of refraction, is propagated to the interni, which thus throws the balance of power in their favor, and gives them, as long as accommodative efforts are going on, the preponderance of force. From which it follows that the tension on the interni can only be relaxed in these cases by relaxing that of the ciliary muscle. This, as a rule, the unaided eye refuses to do, for the reason that distinct vision would have to be given up. When, however, the hypermetropia is completely neutralized, the undue tension on the ciliary muscle is removed, and, as a consequence, that on the interni is also. The abnormal resistance which these latter offer to the action of the interni is thus removed, and these muscles are then left at liberty to bring forth their power in order to maintain binocular single vision, as soon as this is threatened by placing prisms before the eyes with the angle outward.

It often happens that the effect of glasses in increasing, at least to its fullest extent, the abductive force in hypermetropic eyes, is not always obtained at once, even in cases where the externi are not idiopathically weak. It often takes some little time for the eyes to give up the exercise of a certain amount of tension, the employment of which habit has rendered intuitive.

On account of this low degree of abductive power an examination should be made (after the hypermetropia has been neutralized as far as possible) into the condition of the muscles, and if a marked degree of insufficiency of abduction is shown, a tenotomy is, in my opinion, not only justifiable, but necessary, notwithstanding the fact that no actual strabismus exists, and the weight of Donders's opinion against it. The cases requiring operative interference will, of course, be comparatively rare, and the tenotomy must be done, not with the idea of dispensing with the proper correcting glasses, which was Donders's chief objection to it, but with the aim of restoring a normal equilibrium to the muscles.

The next subject which I shall call your attention to, and which I have now only time to briefly touch upon, is the action of the relative accommodation in divergent squint and weakness of the interni, and, as it is in myopic eyes that these affections most frequently occur, my remarks will, in a great measure, be restricted to that condition.

In myopia the relative accommodation is displaced toward the near point, which is exactly the reverse of what it is in hypermetropia, or, what amounts to the same thing, the proportion of accommodative force actually used is always greater in myopia than in emmetropia; consequently the tension on the ciliary muscle is always less, while that on the interni is, from the shape of the eye, always greater for a given convergence than in the normal organ. From this it results that the abductive force is, as a rule, disproportionately great; and, as you are well aware, the first indication in the treatment of insufficiency of the interni is to restore this want of adductive power, by lessening the load which the myopic formation necessarily imposes upon them. The different methods by which this is accomplished, such as tenotomy, the use of prisms and the carrying out the far point by concave glasses, are too familiar to you to need or even to permit any extended comment from me. Still I cannot help thinking that, in practice at least, the important service which suitable glasses may be made to render in preventing the tendency to deviation outward shown by myopic eyes has been much underrated; and in this connection I should like to say a word or two in regard to the effect which concave glasses have on the relative accommodation, through which, I think, their utility in a great measure depends.

As a tendency toward an abnormally great convergence is the chief characteristic of hypermetropic eyes, it must naturally follow that the nearer we reduce a pair of eyes to this condition the greater will be the tendency toward increased convergence of the optical axes; consequently if we have myopic eyes with a tendency toward divergence of the optical axes, we must reduce them to the conditions offered by hypermetropia. This is done in two ways. (1.) By altering the refractive and accommodative condition. (2.) By changing the anatomical ones.

If by means of concave glasses we neutralize myopic eyes, we have, as far as the refraction is concerned, reduced them to a condition of emmetropia, and if the accommodation was good it would be fair to suppose that such eyes would be equal also in muscular force. But this, as Donders proved long ago, is not the case, for in carrying out the far point we have also displaced the relative accommodation outward, and thus in reducing it by glasses to an emmetropic eye for the distance we have changed it for the near into a hypermetropic

eye, as far as the accommodation is concerned; that is to say, an increased degree of tension of the ciliary muscle is demanded with small degrees of convergence, which is just the reverse of what it was before the myopia was neutralized. Now allowing that the increased tension of the ciliary muscle in overcoming the glasses is propagated to the interni, in carrying out the far point we have not only decreased the amount of tension demanded of them by lessening the convergence, but we have also increased their effective ability for that convergence.

This will be made clearer by an example. Suppose a myope of 1-7 habitually reads at his far point, that is, at 7 inches. Under these conditions he is using a considerable amount of the tension of the interni with the minimum amount of accommodation, or even with no accommodation at all (Donders). If now we carry out his far point by neutralizing completely, or partially, his myopia, but so that he can still read with ease at 15 or 16 inches (his near point being no longer at 3, but at about 6), we have by thus reducing the convergence reduced also the amount of tension on the interni to a very large degree. But beside this, by compelling the ciliary muscle, which was formerly idle, to exert its tension in overcoming the glasses, we have gained that amount of force which through its action is always transmitted to the interni. That this is true is proved from the clinical fact that the average adductive force of myopes, who from an early age have worn glasses sufficient to neutralize their myopia, is much greater at their point of near work, and the tendency to deviate outward much less than among those where the error in refraction has not been corrected. For this reason, when in myopia there is any insufficiency in the abductive power, I always make it a rule, whether a tenotomy has been performed or not, to neutralize the myopia, or to come as near this as circumstances, such as the state of the accommodation, amount of vision, and age of patient will permit.

In regard to the second method of relieving the overburdened interni, that by tenotomy, I should have something to say, both as to the indication for and performance of the operation, did not want of time compel me to postpone it till some future occasion.

In conclusion, I would say that the object of these I fear already too extended remarks has been to call attention to a part of the subject of strabismus which has not yet received the attention which I think it deserves. And it is in this connection that I

would suggest that we have hitherto in our treatment of squint paid too much attention to the condition of the recti interni and refraction, and not enough to that of the externi and accommodation.

TWO CASES OF DISLOCATION OF THE CLAVICLE.

By ALBION COBB, M.D., Webb's Mills, Me.

As dislocation of the clavicle seems to be a rather unusual occurrence, I offer the history of two cases, being the only ones which have come under my observation.

On the 24th day of July last, Mr. J. F. H., of Casco, Me., was riding upon a wagon loaded with 23 cwt. of heavy merchandise, when, owing to an obstruction in the road, he was thrown from his seat and fell, face downward, directly in front of one of the forward wheels, which passed over him squarely from shoulder to shoulder. I was sent for to visit him, and found the sternal end of his left clavicle dislocated forwards, and forming a prominent tumor on the front of the sternum. A neighboring practitioner had been called before me, and had attempted to reduce the dislocation, but without success. Seating the patient in a common "office chair," I brought him fully under the influence of sulphuric ether. I then placed my knee against his spine, and, taking a shoulder in each hand, drew them steadily and forcibly backwards, while an assistant made pressure over the seat of the luxation. The bone slipped into its place. The patient was insensible for scarcely a minute in all, and awoke from a pleasant dream. The bone showed no disposition to become re-luxated, but finding, from a glance at "Hamilton on Dislocations," which I had taken the precaution to bring with me, that all the cases of this dislocation which had fallen under the observation of that skilful surgeon had either not been reduced or had escaped after reduction, I made "assurance doubly sure" by treating it like a fractured clavicle, with the addition of a compress over the end of the bone. It has kept its place, in the most satisfactory manner, up to the present time.

The other case came under my observation while a medical officer in the Army of the Potomac, some time during the winter of 1862-3. As the wagoners of the 2d Brigade, 1st Division, 3d Army Corps, were working off the extra exhilaration derived from an overdose of sutler's whiskey, by a pleasant game of fisticuffs, one

of them received a severe upward blow upon the front of his left shoulder, which at once placed him *hors du combat*. As none of his companions were in a condition to know whether he was hurt or only drunk, little attention was paid to him that night, but as he was worse the next morning, I was requested to see him. I found the scapular end of his left clavicle dislocated upward and lying upon the acromion process, which it overlapped an inch or more. Drawing the shoulders backwards, and pressing with my thumb upon the dislocated end of the bone, it was quickly reduced, and, on withdrawing my hand, as quickly became dislocated again. This it persisted in doing for a day or two, in spite of bandages, compresses and adhesive straps, much to my annoyance and vexation, and the pain and discomfort of the patient. At length, however, by some complicated harness, which I cannot now describe, I succeeded in tying it down to its place, and the patient in due time recovered with a good shoulder.

Reports of Medical Societies.

VERMONT MEDICAL SOCIETY. REPORTED BY THE SECRETARY, L. C. BUTLER, M.D.

The fifty-fifth annual meeting of this Society was held at Montpelier, October 20th and 21st. Dr. J. S. Richmond, of Woodstock, President, occupied the chair. The session was opened with prayer by Rev. Mr. Underwood, of Hardwick. The proceedings of the annual and semi-annual meetings were read by the Secretary.

Dr. J. N. Stiles, of Windsor, presented a circular from a committee of the American Medical Association, inviting contributions of medical works from this Society, and from individuals, to a National Medical Library now being established at Washington, D. C. The Secretary was instructed to forward such publications as may be in his possession.

Dr. L. C. Butler, of Essex, from a committee appointed at the last annual meeting of the Society, read a paper on "the medical, social and civil aspects of intoxication by alcohol," in which he urged the point that since the Legislature of the State had by a stringent law prohibited the use of intoxicating liquors for any other purpose than "for medicinal, mechanical, and manufacturing purposes," it ought to protect those who require those liquors as medicines from

the abominable adulterations that make up the great mass of what is now sold as such under the law. This it might do, he said, by appointing a State Assayer of Liquors, and making it his duty to analyze all liquors offered for sale by town agents, and to condemn to confiscation every cask that is not found chemically pure. In its details such a law should fix the standard of purity, and require the officials concerned in procuring liquors for medicinal purposes to forward to the State Assayer samples of each kind to be offered for sale, and no liquor should be allowed to be sold by town agents without the certificate of the Assayer that they are absolutely free from all poisonous drugs and adulterations. Dr. Butler further suggested that all regular druggists and apothecaries in the State ought to be permitted to sell liquors for the purposes allowed by the law of the State, subject to the same restrictions and penalties as the town agents. They are allowed to sell all other medicinal agents and even "poisons," properly labelled, why not alcohol as well, or any of its congeners? The views presented by Dr. Butler met the approbation of the Society, and a committee was appointed to embody them in proper form to be presented to the Legislature, with a view to their enactment into a law, if that honorable body shall deem best.

Dr. A. T. Woodward, of Brandon, read a paper on the *Uses and Abuse of the Speculum*.

Dr. Woodward traced the history of the speculum from "the earliest practitioners of medicine" down to the present day, giving a clear statement of its proper uses and of its abuse, and coming to the conclusion that no case of uterine disease should be regarded as fully investigated, until the speculum has been used either as a principal or accessory instrument. This position he strongly fortified by quotations from various authors.

Dr. F. W. Goodall, of Greensboro', presented details of a case occurring in his practice, and of the *post-mortem* examination, in which the patient was afflicted with a complication of diseases, having gangrene of both feet, cancer of the stomach, tuberculosis, and emphysema.

The above papers, being the only ones presented before the Society, were severally referred to the committee on publication.

The delegates to the Medical Department U. V. M., made a favorable report of their attendance upon the examination of students for graduation, and commended the College to the favorable consideration of the profession.

The President's address was delivered Wednesday evening, and was directed more especially to the exposure of certain shortcomings of the profession, with suggestions as to the appropriate remedy to be applied. The address was able and interesting. A considerable portion of the sessions of the Society was spent in the verbal presentation and discussion of cases in practice, by different members.

The officers of the Society for the ensuing year are as follows:—*President*, Dr. Henry Janes, of Waterbury; *Vice President*, Dr. Abram Harding, of South Hero; *Secretary*, Dr. L. C. Butler, of Essex; *Assistant*, Dr. Chas. H. Tenney, of Hartford; *Treasurer*, Dr. J. E. Macomber, of Montpelier; *Auditor*, Dr. C. M. Chandler, of Montpelier. *Board of Councillors*, Drs. M. J. Hyde, O. F. Fassett, O. E. Ross, J. Perkins, B. F. Morgan, C. P. Frost, Kimball Russ, E. F. Upham, A. J. Hyde, C. W. Peck, J. H. Richardson, Salmon Brush, S. Putnam, F. W. Goodall, one for each county in the State. *Committee on Registration Report*, Drs. L. C. Butler, O. F. Fassett. *Delegates*—to New York Medical Society—Drs. L. C. Butler, J. S. Richmond, A. T. Woodward; to New Hampshire Medical Society—Drs. J. N. Stiles, H. R. Phelps; to Massachusetts Medical Society—Drs. C. L. Allen, A. E. Pond; to Maine Medical Association—Drs. G. B. Bullard, N. W. Braley; to Connecticut Medical Society—Drs. Chas. A. Sperry, P. D. Bradford, A. Harding; to Rhode Island Medical Society—Drs. J. H. Hamilton, C. H. Tenney; to Connecticut Valley Medical Society, Drs. E. F. Upham, A. C. Welch; to U. V. M. Medical Department—Drs. C. M. Chandler, S. Putnam, O. F. Fassett; to American Medical Association—Drs. G. W. Nichols, Henry Janes, H. R. Jones, H. D. Holton, S. W. Thayer, A. T. Woodward, A. C. Welch.

The semi-annual meeting is to be held in Burlington on the first Wednesday and Thursday of June, 1870.

Owing to the devastations of the flood which occurred but a few days previous to the session, the attendance upon this annual meeting was small. And for the same reason, probably, no delegates were present from other State societies.

CAFFEINE IN POISONING BY MORPHIA.—Dr. Seneker injected three grains of caffeine hypodermically in ten minutes. The patient quickly recovered.—*St. Louis Medical Journal*.

Medical and Surgical Journal.

BOSTON: THURSDAY, DECEMBER 9, 1869.

ABUSE OF INSANE ASYLUMS AGAIN.

THE following is from a daily newspaper, and is probably a paragraph that is going the rounds:—

"Visitors are hereafter to be excluded from the Jacksonville, Illinois, State Insane Asylum, on humane grounds. The evils, if any, resulting from too many visitors must be less than those resulting from cruel treatment and false imprisonment of the sane, both of which are too common, notwithstanding the safeguards now established to prevent their occurrence. The exclusion of visitors would seem to be a step in the wrong direction."

Cruel treatment of the insane and false imprisonment of the sane in public asylums are accusations easy to make. But, so far as this country is concerned, we do not believe in those crimes as common occurrences. The remark about the introduction of visitors shows ignorance of the first principles of the treatment of lunatics.

In reply to an article in our issue of Oct. 14th the *Boston Post*, a few days after that date, printed a courteous paragraph which seemed to indicate that that journal had been aroused to a sense of the injury which was likely to accrue from the publication of sensational appeals such as we had aimed upon. But the *Post* of Dec. 1st has a lengthy editorial entitled "The New Social Outrage," in which it gives indications of backsliding into its former error. By way of rejoinder, we reiterate all that we said in our former article. The *Post* shares in what we believe to be a popular prejudice, so far as our *public* Lunatic Hospitals are concerned. As to *private* insane asylums, they should rarely be allowed to exist, particularly in large cities; and not at all save under the strictest and the constant surveillance of law officers.

But it is of little avail to try to reason the popular mind out of a *prejudice* against any institution or class of institutions. The only thing to be done to combat such erroneous impression, when we cannot af-

ford to wait for it to die out, is to meet it with all possible measures of security against the evil it dreads. Therefore, though fully believing the premises of our cotemporary to be wrong, we coincide with it in the conclusion to which it arrives, and which we reach by a different road. Says the *Post*:—

"It is time that some sort of a tribunal was established by every legislature, that shall be competent to decide a question of lunacy at the start, before which the accused may enjoy at least equal rights with those of a common felon before a magistrate's court. Shall a criminal be provided with protecting restraints which are denied a respectable and well-known citizen?"

On pages 229 and 230 of our present volume is the following quotation:—

"In the 'project of a law for regulating the legal relations of the Insane,' which was unanimously sanctioned by the 'Association of Medical Superintendents of North American Hospitals for the Insane,' we find the following section:—'Insane persons may be placed in a hospital for the insane by their legal guardians, or by their relatives or friends in case they have no guardians, but never without the certificate of one or more reputable physicians, after a personal examination made within one week of the date thereof; and this certificate to be duly acknowledged before some magistrate or judicial officer who shall certify to the genuineness of the signature, and of the respectability of the signer.'"

"Under such a provision the insane may be promptly, quietly, and, with a few possible exceptions, rightfully, placed by their friends in some hospital for the insane. For the possible exceptions, we would have a provision applicable to them alone, and not, at the same time, subjecting all the rest to positive discomfort and injury. If the writ of *habeas corpus* should not be supposed to furnish sufficient relief, a commission might be appointed especially for this purpose. In the 'project of a law' just mentioned, we find the following provision:—'On a written statement being addressed by some respectable person to some high judicial officer, that a certain person then confined in a hospital for the insane is not insane, and is thus unjustly deprived of his liberty, the judge, at his discretion, shall appoint a commission of not less than three nor more than four persons, one of whom, at least, shall be a physician, and another a lawyer, who shall hear such evidence as may be

offered touching the merits of the case, and, without summoning the party to meet them, shall have a personal interview with him, so managed as to prevent him, if possible, from suspecting its objects. They shall report their proceedings to the judge, and if, in their opinion, the party is not insane, the judge shall issue an order for his discharge."

This arrangement would probably be satisfactory to the newspaper writers and the public. But, if it should not be deemed stringent enough, the two formalities, we would submit, might be yoked together, by making the first temporary and provisional, to be sanctioned or negatived by the second tribunal proposed, which tribunal should, however, sit in all cases, instead of merely in the exceptional ones alluded to. Responsible officers might be appointed, under whose supervision the preliminary detention should be effected, and whose business it should be to see that the cases were brought as speedily as possible before the "commission." Such commission, or commissions, would naturally become permanent and in constant employment; and its (or their) expenses would properly be defrayed out of the public purse.

We must repeat, here, our former quotation from the eminent writer in the *American Law Review*, to the effect that such legislation would not prevent all popular clamor now so loud and wrathful.

"That will continue as long as the wrongful imprisonment of sane persons is capable of adding to the interest of a novel, or as long as the stories of the insane are received by credulous people as unqualified truths."

One or the other of the concessions suggested, however, might put some check on the now too prevalent practice of leaving the insane at large, to harass their friends, waste their substance, or commit frightful homicides on innocent persons. We but too frequently read accounts of butcheries committed by irresponsible lunatics.

NOTES FROM FRENCH JOURNALS.

Case of Gangrene of the Vagina following application of Perchloride of Iron.—The *Bulletin Général de Thérapeutique* quotes the case from the *Gazette des Hôpitaux*. A

lady 40 years of age, of excellent constitution, and usually enjoying good health, having gone through a natural and easy labor eight months previous, had been suffering from slight metrorrhagia of three weeks' duration, when she consulted Dr. Tissier at the commencement of March, 1867. The 15th of March there suddenly occurred, without discoverable cause, a discharge of sanguinolent serum, with clots intermingled, from a litre and a half to two litres in quantity. This was attended with paleness, cold sweats, and chilling of the extremities. The pulse was imperceptible, the action of the heart feeble and slow, the voice extinct. Doctor Tissier having been called in haste, covered the abdomen with cold compresses, and introduced into the vagina without the speculum a tampon consisting of dossils of "charpie" dipped in pure perchloride of iron; and in addition other masses of the same kind of tampon soaked in an aqueous solution of the perchloride in the proportion of one part to four. At the same time he gave, at intervals of ten minutes, powders of ergot of rye consisting of 25 centigrammes each; cold beef tea; ice; and subsequently tea containing rum. In two hours the flux was arrested. The next day the more superficial layers of charpie were removed; and the remaining ones—those soaked with pure perchloride of iron—were taken away at the end of forty-eight hours, without the patient complaining of the least pain. Five days after, there was a feeling of burning in the vagina. Emollient injections brought away mucous *débris*. The seventeenth day after the plugging, a piece of mucous membrane 6 centimetres long and 2 broad was discharged. The patient had a slow convalescence.

About six weeks afterwards, the menses being pale and scanty, M. Tissier made a digital examination, and detected at a distance of four centimetres from the vulva, a very fine fibrous ring, scarcely admitting the passage of the finger. Two centimetres further there was a second ring, upon which the cervix uteri rested.

In communicating the case to the *Société de Médecine de Paris*, Dr. Tessier added that he knew of two other instances of in-

introduction of perchloride of iron into the vagina, with the same accident resulting. And Dr. Léon Gros, who was appointed to make a report upon the subject, concluded, from his survey of the facts, that in cases of uterine hæmorrhage, where it may be thought necessary to apply pure perchloride of iron within the vagina, certain precautions are necessary. These precautions consist in beginning by filling the *culs de sac*, by means of the speculum, with "charpie," either dry, or soaked in a solution of the perchloride; in limiting the application of the undiluted styptic of iron, to the neck of the womb; and in surrounding the latter organ with a sufficient quantity of charpie to prevent the contact of the agent with, and its caustic action upon the vaginal mucous membrane. This is the more important if the vagina be at any point bare of epithelium.

Elective Action of Drugs.—A writer in the *Gazette Hebdomadaire*, after eulogizing Claude Bernard's experiments on morphine of which we made a brief abstract in our issue of December 2d, goes on to say that the combined soporific and excitant action of morphine does not appear to Bernard as necessitating the supposition of two substances in the drug to be assumed as not yet isolated by chemistry, and as dividing between them this double action. He believes in the chemical unity of morphine, and explains its double influence by two periods of one and the same physiological action. Such action in different substances may vary in their respective lengths of duration and degrees of intensity, these variations constituting differences of more or less. Does not this double action—says Fonsagrives, the reviewer in the *Gazette*—depend simply upon the fact that the morphine borne on by the circulation, and following the mechanical (?) laws of that function, proceeds to touch and impress the different organs or their elements, some of which respond to the appeal, and in forms corresponding to their special impressibility, while other organs remain mute. From the silence of the latter and the varied language of the former is found the *phenomenal* phraseology which is the formula of the physiological action of a drug or a poison. In this way, and in no other, is the reviewer

able to comprehend the *elective* action of drugs. The substance is inert; it does not guide itself; it does not take this or that direction by its own choice. Carried passively, mechanically, by the blood with which absorption has mingled it, it impregnates all the organs, and brings into play their sensibility to it, or tests their impassibility. Sometimes a single organ *speaks*; but all are *interrogated*.

The science of medicinal action, says Fonsagrives, is at its commencement, and Claude Bernard has the signal honor of tracing its programme. But if physiology be true to its *rôle* in seeking to pierce the mysteries of the inner, molecular action of drugs, let clinical investigation, on the other hand, hold to its own, by reserving to itself the study of their external, phenomenal, and symptomatic action. The hospital bed and the laboratory will furnish the therapeutical deductions to be based on the two methods of research, neither of which can by itself supply those deductions. The two methods will be well nigh combined in the same mind, when they shall have encountered a man who is at once a physiologist like Bernard, and a clinical observer like Trousseau. But that day, the reviewer fears, is far off.

MR. EDITOR.—In the JOURNAL of Nov. 11, in the article "Raising the Drowned," G. W. G. says, "Have you or any of your readers," &c. "If so, can you suggest a better theory?" &c. You reply, and in that reply suggest the idea that if a body did rise when the cannon was fired, you would account for it as a coincidence. You also advance the theory that decomposition must be so far advanced that gas will be evolved sufficient to make the specific gravity less than that of water before the body can float. There can be no doubt of the truth of your theory; and in the summer we look for a body to float in about nine days after the drowning, while if one is drowned in early spring the corpse may not be found until the water is warmed by summer heat. But now for the cannon. Three years since I was a doubter like yourself, but about that date I was forced to accept the fact by witnessing a body appear "at the bidding" of the cannon about twenty hours after drowning. The fact being indisputable, a better theory than

"bursting the gall-bladder" was needed for me; and if I am not mistaken I have it in this wise. The body of an ordinary sized person will float by the aid of a gas-bag or life-preserver displacing eight pounds of water. If so, then by any force brought to bear on the body exerting that amount of lifting power, the body would come to the surface. That lifting power in the case to which I have alluded was furnished by a cannon loaded with seven pounds of blasting powder and wadded with damp oakum, driven home with a heavy sledge. The pressure of the atmosphere at the distance of two hundred yards from the gun was such as to draw stout panes of glass from windows, and the body, which lay in ten feet of water at a distance of a hundred feet from the shore, was no doubt brought to the surface by atmospheric pressure solely. It needed but the few pounds of lifting to float, and it got those few pounds from the pressure of the atmosphere [to fill the vacuum*] caused by the explosion. If my theory is false, explode it and set up the true one; as to the fact, there is no way to set that aside.

Respectfully submitted,

WM. L. LINCOLN.

THE DRY EARTH TREATMENT—THE CASE OF ANNIE PEOPLES.—As, by an unusual oversight and omission on the part of all the papers in the city, except one, the termination of the case of Annie Peoples, in which the earth treatment was tried, was incompletely reported, it is due to Dr. Addinell Hewson, who appeared as a witness on the trial, that the following statement should be published:—

"In the testimony which the counsel for the defence produced for his client, he did not prove, as in his opening address to the jury he had promised to do, that Dr. Hewson's professional associates at the hospital had repudiated the use of dry earth as a dressing, and the cross-examination of those gentlemen by the District Attorney elicited the facts that they had applied to offensive sores a preparation of which the chief component is clay, and that none of them believed it to be irritating. The counsel for the defence did not produce a single witness to whom such dressings had been applied, to establish that they are irritating, or in any way injurious; nor did he produce a single witness to corroborate the testimony of the chief witness for the de-

fence, Dr. Chapman. These facts, coupled with that of the alleged prejudice which this witness entertained against Dr. Hewson, and with the actual abandonment by the counsel for the defence of his adopted line, even before any testimony in rebuttal (which would have included that of patients treated with such dressing, and of eminent surgeons in the city, who had been subpoenaed) had been produced, show that the allegation of malpractice was untrue, and could not be sustained. Judge Ludlow, in his charge to the jury, set this forth very emphatically. He said that 'the Commonwealth had only pressed for a verdict of murder in the second degree. The counsel for the prisoner had conceded that his opening address as to the maltreatment had failed. There was evidence as to fighting, sufficient, perhaps, to reduce the grade, and the counsel on both sides had agreed to take a verdict of voluntary manslaughter.'"

—*Medical and Surgical Reporter.*

MR. SPENCER WELLS'S CIRCULAR CLAMP FOR OVARIOTOMY.—This instrument, made by Mayer and Meltzer, was shown by Mr. Wells at the last meeting of the Clinical Society as the best form of clamp for ovariectomy. He explained how he had gradually arrived at this form of instrument after using Hutchinson's clamp, his own first parallel clamp, and different forms of wire and écraseur clamps, and stated that this new circular clamp is very easily applied and removed, and secures the pedicle quite safely and by a circular constriction, which enables the operator to close the opening in the abdominal wall tightly around the pedicle.—*Lond. Medical Times and Gazette.*

THE "ALPHA" RAILWAY ARM AND BOOK REST.—This little mahogany machine (made by Howard, Berners Street, London, W.), which is little more than a foot long, and about a pound in weight, unfolds in such a way as to make a convenient rest for the arm in railway travelling. By supporting the arm, it takes the weight off the spine, and diminishes both the fatigue and jolting incident to the erect posture. It is equally available for first-class railway carriages where the arms are too low, and for the second-class seats which have no arms at all. It is equally useful in an ordinary carriage drawn by horses, as well as for invalids who want to read in their easy chair, and we believe that it ought to form a part of the travelling comforts of all whose avocations compel them to travel much.—*Ibid.*

* The only point we care to criticize in the preceding letter is the introduction of the words we have placed in *italics*.—*Ed.*

FRATERNAL LOVE (*a post-mortem sketch*).—Here's a specimen of egotism, says the *Santé Publique*, exhibiting one aspect of human nature.

A certain physician was in attendance upon a very rare form of disease. In spite of his care the patient died. The physician, in the interest of science, asked the brother to permit him to make an autopsy.

The brother bounded up in indignation.

"What? touch my brother, my poor brother! Profane his corpse! Never! You shall kill me rather than make me forget the respect due to a beloved dead."

"But in the interest of science? —"

"In your own interest, then."

"Ha!" exclaimed the brother in surprise.

"Hem! Are you not of the same blood? The disease which has carried off your brother may have also germinated in yourself. Let me examine the nature of the case by this *post mortem*, and it will become easier for me to combat the disease when it makes its appearance in your own person."

The brother became pale. A quarter of an hour afterwards he himself begged that the autopsy should be made—made with every detail—with extensive notes of everything observed. In short, he insisted so much upon the minute examination of every organ, that the doctor was obliged to say to him:—

"Exactly so. If I comprehend you, sir, you request me to cut your brother up in small pieces, sir, do you not?"—*Medical Record*.

From a report of the Social Science Congress at Bristol, published in the *London Medical Times and Gazette*, we make the following extract:—

"AMUSEMENTS.—The great misery of the world is not dying, but dragging on a maimed, mutilated existence, in which labor is suffering, and pleasure is a burden and disappointment, a state without spring, and without light or color, or at best a dull, monotonous *chiaroscuro*, which, if not distressing, is utterly joyless. Yet to vast multitudes life is nothing better, because in the districts inhabited the fountains of life are inadequate, or are adulterated and poisoned. We cannot very much wonder that the artisan, dulled and half stupefied by the close air and ill odors of the workshop and the lodging, or by the fumes of the factory, should reel into the cheerful beerhouse or the glittering gin-shop, craving for some temporary relief to his weariness and de-

pression. I need scarcely remark *en passant* that one of the most crying wants of the community, with regard to public health, is provision for unobjectionable amusement. In supplying his needs it is not enough to give him oxygen in plenty, and pure water and wholesome food; he has to be entertained as well as fed. Recreation and play are as necessary to mankind as are food and raiment. And if there are not sources of rational and innocuous amusement, then there will inevitably be riot and debauchery. An enlightened and refined community will some day provide for these things. It will not, as of old, be left to self-seeking, ambitious consuls and emperors to corrupt the people with "*panem et circenses*;" but governments will keep a paternal eye over the sports and amusements, as well as over the health and the toil of the great mass of the community."

THE Board of Naval Officers recently in session at the Navy Department to determine upon the relative rank of line and staff officers, have submitted their report to the Secretary of the Navy. It is said they recommend that surgeons of the fleet, paymasters of the fleet, engineers of the fleet, and surgeons, paymasters and chief engineers of more than twelve years' standing, shall rank with commanders, surgeons, paymasters and chief engineers of less than twelve years; and the secretary of the admiral and the secretary of the vice-admiral shall rank with lieutenants; past assistant surgeons and first assistant engineers shall rank next after lieutenants; assistant surgeons, assistant paymasters and second assistant engineers shall rank next after masters; third assistant engineers shall rank with midshipmen. These ranks are one grade below those held by the staff officers for several years past, and are in accordance with the acts of Congress of August 15th, 1854, and March 3d, 1859. The rank held by staff officers for several years past was established by an order from the Navy Department of March 13th, 1863, but was never approved by Congress.—*Boston Daily Advertiser*.

This reads very much like making bad worse.

THE addition of 1-5000 part of tartaric acid renders the syrup of the *iodide of iron* clear when it has become turbid, and notably diminishes its inky taste.—*New York Medical Gazette*.

Medical Miscellany.

DEATHS FROM CHLOROFORM.

Death from twenty Drops of Chloroform.—The chloroform was pure, and was given by means of a cone of lint. The pulse stopped suddenly, and all efforts to restore animation were unavailing. The autopsy showed the heart to be rather large and flabby, but otherwise free from disease. The other organs were normal.—*N. Y. Med. Record*, Dec. 1, 1869.

New York, Dec. 3.—Mrs. Sarah A. Kruger died at the Washington Hotel, Fourth Avenue, on Wednesday night, from the inhalation of chloroform, which her husband bought for her at a drug store without a prescription. The two had not lived together for a year, and Dr. Cormins testified that she had told him she intended to take her life in that way, owing to her domestic troubles. The jury found that her death was occasioned by inhaling chloroform to relieve headache.—*Boston Daily Journal*, Dec. 3, 1869.

PARKER'S BREACH-LOADING DOUBLE-BARREL SHOT-GUN.—A pamphlet of 16 pages describing the weapon is sent us, with the offer of one of the guns as compensation for advertising it. The publisher of this JOURNAL thinks we do not need the article just now for the defence of the office—so he does not want the shot-gun.

We do not prescribe lead uncombined in the form of pills or pellets—so we do not want the shot-gun.

Those doctors whose victims are not all unfeathered bipeds, may like to know that this breech-loader is recommended by Gen. Sigel and other men of war; but for ourselves—we do not want the shot-gun.

We have received from Messrs. A. Williams & Co., 135 Washington St., Boston, a copy of the Address delivered on the Centennial Anniversary of the birth of Alexander von Humboldt, under the auspices of the Boston Society of Natural History, by Louis Agassiz, with an account of the evening reception. It is published under the direction of the Boston Society of Natural History. Every one should possess himself of a copy of this elegantly printed pamphlet. To get an estimate and a personal view of the great naturalist and physicist through the eyes of Agassiz is a rare privilege. Especially satisfactory is it to learn that the mind of Humboldt was not darkened with atheism.

We are requested to note that in the *Galaxy* Dr. J. C. Dalton and Dr. J. C. Draper will represent the scientific department.

SINDOR OIL AND SINDOR BALSAM.—These substances are said to be most valuable in skin diseases. They are extensively used by the Javanese. The balsam should have, if genuine, a specific gravity of .922, and boils at 236°. It strikes a blood-red color on being brought in contact with sulphuric acid.—*Medical Press and Circular*.

MEDICAL DIARY OF THE WEEK.

MONDAY, 9, A.M., Massachusetts General Hospital, Med. Clinic. 9, A.M., City Hospital, Ophthalmic Clinic.
TUESDAY, 9, A.M., City Hospital, Medical Clinic, 10, A.M., Surgical Lecture. 9, A.M., Boston Dispensary. 11, A.M., Massachusetts Eye and Ear Infirmary.
THURSDAY, 9 A.M., Massachusetts General Hospital, Medical Clinic. 11, A.M., Massachusetts Eye and Ear Infirmary.
FRIDAY, 9, A.M., City Hospital, Ophthalmic Clinic; 10, A.M., Surgical Visit; 11, A.M., OPERATIONS. 9, A.M. Boston Dispensary.
SATURDAY, 10, A.M., Massachusetts General Hospital Surgical Visit; 11, A.M., OPERATIONS.

TO CORRESPONDENTS.—Communications accepted:—Medical Education of Women—Letter from Maine.

BOOKS AND PAMPHLETS RECEIVED.—A Practical Treatise on the Diseases of Children. By Alfred Vogel, M.D. Translated and Edited by H. Raphael, M.D. From the Fourth German Edition. New York: D. Appleton & Co. Pp. 593. Six Lithographic Plates.—A Catalogue of the Officers and Students of Harvard University, for the Academic Year 1869-70. First Term. Pp. 106.—Report of the Committee on Medical Education. Extracted from the Transactions of the American Medical Association. Pp. 30.—Thirty-fourth Annual Report of the Industrial Aid Society for the Prevention of Pauperism, Boston. Pp. 28.

DIED.—In Worcester, Dec. 7th, suddenly, Dr. Benjamin F. Heywood, aged 75 years.

Deaths in seventeen Cities and Towns of Massachusetts for the week ending Dec. 4, 1869.

Cities and towns.	Number of deaths in each place.	Prevalent Diseases.			
		Consumption.	Diphtheria.	Typhoid Fever.	
Boston	101	17	13	4	0
Charlestown . . .	14	1	1	1	0
Worcester	19	3	1	2	0
Lowell	13	4	0	0	0
Milford	6	2	2	1	0
Chelsea	7	2	0	0	0
Cambridge . . .	10	3	2	1	0
Salem	11	3	1	0	0
Lawrence	4	1	1	0	0
New Bedford . .	10	2	2	1	0
Lynn	7	2	0	0	0
Pittsfield	4	2	0	1	0
Gloucester	9	1	1	4	0
Fitchburg	1	0	0	0	0
Newburyport . .	3	0	1	0	0
Fall River	6	1	2	0	0
Haverhill	4	1	0	0	0
	229	44	27	15	00

Boston reports ten deaths from scarlet fever, and nine from croup and diphtheria. Boston, Charlestown and Worcester each report one death from smallpox. During the month of November there were five deaths from smallpox in Blackstone, and four in the neighboring town of Northbridge.

GEORGE DERRY, M.D.,
Secretary of State Board of Health.

DEATHS IN BOSTON for the week ending December 4, 101. Males, 51—Females, 50.—Apoplexy, 1—disease of the bladder, 1—inflammation of the bowels, 2—congestion of the brain, 1—disease of the brain, 3—inflammation of the brain, 2—bronchitis, 4—cancer, 3—consumption, 17—convulsions, 2—croup, 4—diarrhea, 2—diphtheria, 5—dropsy, 1—scarlet fever, 10—typhoid fever, 4—gastritis, 1—disease of the heart, 4—infantile disease, 1—interperence, 1—disease of the kidneys, 2—disease of the liver, 1—congestion of the lungs, 1—inflammation of the lungs, 13—marasmus, 3—old age, 3—pyæmia, 1—smallpox, 1—tetanus, 1—unknown, 7.

Under 5 years of age, 39—between 5 and 20 years, 6—between 20 and 40 years, 24—between 40 and 60 years, 16—above 60 years, 16. Born in the United States, 63—Ireland, 28—other places, 11.